

REMARKS

Claims 14-29 are pending in the present application. Applicants respectfully request reexamination of the application and reconsideration of the rejections in view of the following remarks, which follow the order set forth in the Office Action.

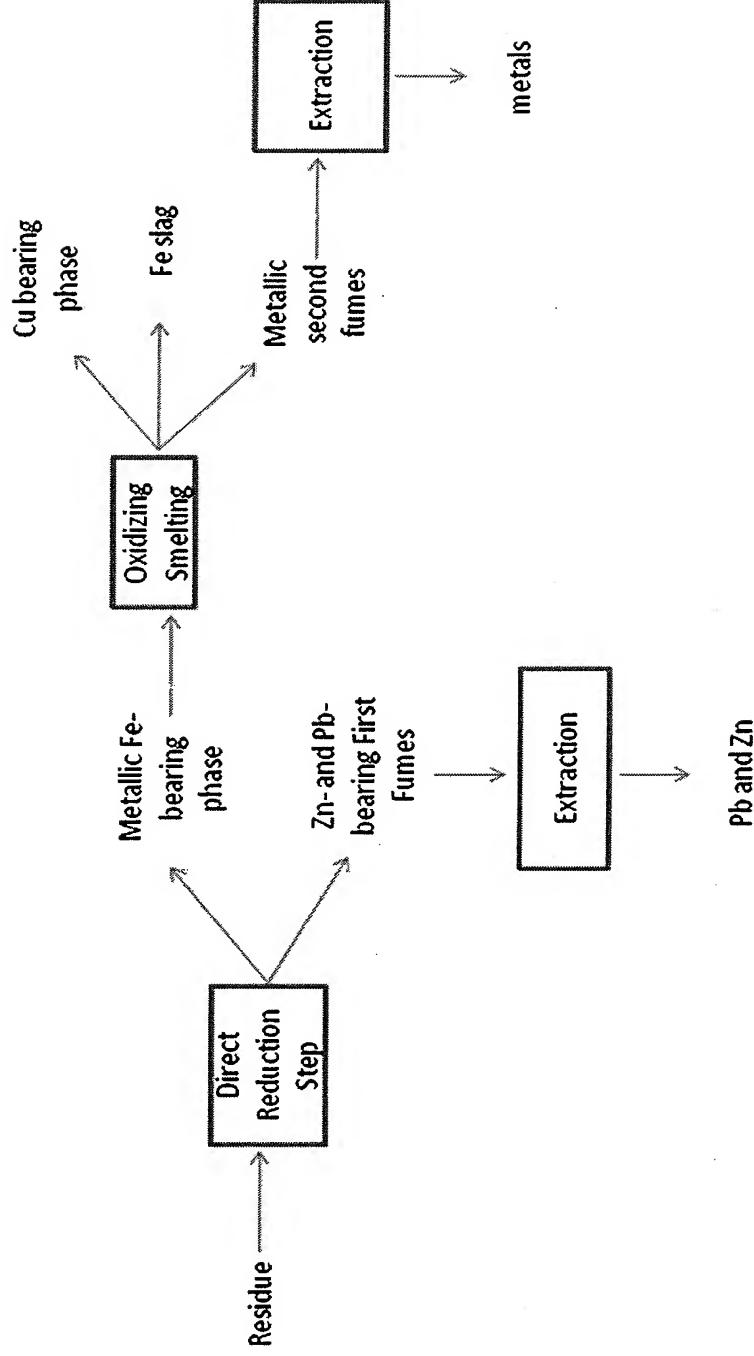
Interpretation of “Valorization”

The Office Action indicated that the Examiner will interpret the term “valorizing” to mean “recovering zinc and lead for further use”. Applicants accept this interpretation of the term.

Rejections under 35 U.S.C. § 103

Claims 14-16, 20, and 27-29 were rejected under 35 U.S.C. § 103 as being allegedly unpatentable over Novoa et al., U.S. Patent No. 4248624 (“Novoa”) in view of Stevenson, U.S. Patent No. 3,756,804 (“Stevenson”), alternatively in view of Ford, Jr., U.S. Patent No. 5,922,261 (“Ford”) and Evans et al., U.S. Patent No. 3830639 (“Evans”). Applicants traverse these rejections.

Claim 14 relates to a process for valorizing metal values in a Zn-, Fe- and Pb-bearing residue. The process comprises subjecting the residue to a direct reduction step, thus producing a metallic Fe-bearing phase and Zn- and Pb-bearing first fumes. The Zn- and Pb-bearing first fumes are extracted to recover the Zn and Pb. The metallic Fe-bearing phase is subjected to an oxidizing smelting step thus producing an Fe-bearing slag and second metals-bearing fumes. The second metals-bearing fumes are extracted to recover metals contained therein. The following flowchart is a high-level schematic flowchart of the claimed process. The flowchart merely provides a visual representation of that which is disclosed in the specification and recited in the claims. It is being used as an aid for explanatory purposes and should not be considered to be limiting in any way to the scope of the invention.



The claimed process includes a direct reduction step, an oxidizing step, and two separate extraction subprocesses for recovering metal from the first and second metallic fumes. The claimed process provides for the separation and recovery of a wide range of non-ferrous metals like Cu, Ag, Ge, and Zn from residues of the Zn manufacturing industry. *Specification* p. 3, lines 1-3. In the present invention, the valorization of iron is unimportant due to its relatively low concentration in the contemplated residues and its rather low intrinsic value. *Specification* p.3, lines 5-7. Rather, iron in the form of iron slag is produced by the process and is discarded. Applicants assert that the fact that iron is slagged instead of being recovered as a metal is a small price to pay for achieving an excellent separation and recovery of the non-ferrous metals. The slag appears to be environmentally acceptable and can even be upgraded as gravel substitute in concrete. *Specification* p. 4, lines 32-36.

Non-ferrous metals are recovered, in part, due to the oxidizing step that forms the iron slag. Thus, the choice to discard iron as slag enables better recovery of non-ferrous metals. In addition to producing iron slag, the oxidizing step also produces a Cu-bearing phase from which precious metals, such as Ag, can be recovered and second metallic fumes from which Ge and In may typically be recovered. *Specification*, p. 4, lines 36-39. Without the oxidizing step, the recovery efficiency of these non-ferrous metals would be less effective.

In contrast, none of the cited references discloses the step of “subjecting the metallic Fe-bearing phase to an oxidizing smelting step, thereby producing an Fe-bearing slag and second metals-bearing fumes,” as required in claim 14. Furthermore, none of the cited references discloses or suggests the possibility of a first production of fumes in a reduction process, followed by a second production of fumes in an oxidation process, as required in claim 14. This fundamental difference with the cited references stems from radically different recovery objectives. While the recovery of iron is a central objective in the Novoa, Stevenson, Ford, and Fastje references, an objective of the current invention is the recovery of non-ferrous elements. In fact, the Novoa, Stevenson, Ford, and Fastje references are all directed to methods for recovering iron in metallic form or at least reducing iron containing compounds as much as possible. More specifically, each of these references discloses feeding an iron containing compound in combination with extraneous carbon in the form of coke to a furnace in order to reduce the iron containing compound. Given the objectives of the Novoa, Stevenson, Ford, and Fastje references, it would be counterintuitive for these processes to include a step wherein

metallic iron or reduced iron compounds are oxidized to form iron-bearing slag, as recited in claim 14. Given the contrasting objectives between the Novoa, Stevenson, Ford, and Fastje references and the instant invention and the complete lack of one of the fundamental steps of claim 14, Applicants assert that claim 14 is not obvious in view of the Novoa, Stevenson, Ford, and Fastje references, either alone or in combination.

With regard to the Evans reference, the Office Action cites Evans for teaching that blast furnace slag comprises Fe_2O_3 . OA, p. 6. Evans relates to the production of colored glasses, using a glass bath that comprises a slag containing iron and other metals susceptible of imparting the required color to the glass. Evans, Example 1. Evans fails to disclose anything about an iron oxidizing step to form iron-bearing slag or anything about the valorization of non-ferrous metals present in the fumes from a direct reduction step or an oxidizing step. As such, Evans fails to overcome the deficiencies of the other cited references. Accordingly, none of the cited references, in any combination, make obvious the invention of claim 14. Based on the foregoing, Applicants respectfully request reconsideration and withdrawal of the instant rejection.

For the foregoing reasons, claim 14 and claims 15-29, which are dependent thereon, are considered to be allowable. A Notice to this effect is respectfully requested. If any questions remain, the Examiner is invited to contact the undersigned at the number given below.

Date: 10/10/08

Respectfully submitted,

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